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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,212	09/24/2003	Sarah E. Kim	ITL.1039US (P14622)	2146
21906	7590	03/25/2005	EXAMINER	
TROP PRUNER & HU, PC 8554 KATY FREEWAY SUITE 100 HOUSTON, TX 77024			CHU, CHRIS C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,212

Applicant(s)

KIM ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10 - 25 is/are pending in the application.
- 4a) Of the above claim(s) 14 - 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10 - 13 and 18- 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II and Species V (Fig. 21) in the reply filed on December 13, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Furthermore, the previous restriction requirement improperly grouped. The proper listing of species and claims should be:
 - a. Species I – Figs. 19 and 20, BGA mounting and all dice stacked, to which claims 14 – 17 are drawn;
 - b. Species II – Figs. 21 – 23, BBL mounting and at least one die not stacked, to which claims 18 – 25 are drawn.
 - c. Currently, claims 10 – 13 are generic to all species.

Applicant elected the species of Fig. 21 that is an election of species II (claims 18 – 25) and thus claims 18 – 25 along with generic claims 10 – 13 are herein examined. Claims 14 – 17 are withdrawn. The requirement is deemed proper and is therefore made FINAL.

Drawings

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3. The drawings are objected to as failing to comply with 37 CFR 1.83(a), 37

CFR 1.84(p)(4) and 37 CFR 1.84(p)(5) because:

- (A) Reference character “30” has been used to designate both a metal on page 8, line 6 and re-combiner/condenser on page 10, line 11.
- (B) The drawings include the following reference characters not mentioned in the description:
 - In Fig. 2 – Fig. 6 and Fig. 9, the reference number “10”;
 - In Fig. 6 – Fig. 9, the reference number “40”;
 - In Fig. 8, the reference numbers “38a” and “38b”;
 - In Fig. 19, the reference number “110”; and
 - In Fig. 23, the reference number “150”.
- (C) The drawings must show every feature of the invention specified in the claims. Therefore, the limitation in claim 13 “stacking said first die on said second die”, claim 20 “said condenser is formed on a third die” and claim 21 “said integrated circuit die is mounted on said integrated electroosmotic pump die.” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure

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must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 10 – 18 and 20 – 25 are objected to because of the following informalities:
- (A) In claim 10, line 5, "said condenser" lacks antecedent basis;
 - (B) In claim 20, line 2, "said condenser" lacks antecedent basis and "a first die and said" should be -- a first die, said--; and
 - (C) In claims 10 – 18 and 20 – 25, needs comma after numbers.
(i.e., --claim 10, wherein--).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 13 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(A) In claim 13, it is unclear what the applicant regards as “stacking said first die on said second die.” That is, the limitation of claims 10 and 11, “the integrated electroosmotic pump mounted on said integrated circuit” and “said integrated electroosmotic pump being part of a second die” precludes the second die is mounted on the first die. Therefore, the limitations are contradicting each other, hence the claim cannot be understood.

(B) In claim 20, it is unclear what the applicant regards as “said condenser is formed on a third die” because the drawing and specification of the instant invention does not disclose a third die under the bumpless build-up layer (BBL) package, hence the claim cannot be understood.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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8. Claims 10 – 13 and 18 – 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Kenny, Jr. et al. (U. S. Pat. No. 6,606,251).

Regarding claim 10, Kenny, Jr. et al. discloses in e.g., Fig. 17A a packaged integrated system comprising:

- an integrated circuit (200; column 9, lines 64 and 65);
- an integrated electroosmotic pump (1230; column 24, lines 29 – 30) mounted on said integrated circuit;
- a re-combiner (the condensation area for fluid that is heated by the device 200 in the element 1410; column 24, lines 48 – 58); and
- a package (2000) including said circuit, said pump, and said condenser (see Fig. 17A).

Regarding claim 11, Kenny, Jr. et al. discloses in e.g., Fig. 17A said integrated circuit (200) being part of a first die (column 9, lines 64 and 65) and said integrated electroosmotic pump (1230; column 24, lines 29 – 30) being part of a second die (1100 and 1230, a part of element 1200 which is a die; see Fig. 8, Fig. 9 and column 11, lines 9 – 15), said second die having a first side and a second side, said pump formed on said first side (see Fig. 17A).

Regarding claim 12, Kenny, Jr. et al. discloses in e.g., Fig. 17A including microchannels (1430; column 23, lines 49 and 50) to circuit cooling fluid on said second side and said second side mounted on said first die (see Fig. 17A).

Regarding claim 13, Kenny, Jr. et al. discloses in e.g., Fig. 17A including stacking said first die (200) on said second die (1100).

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Regarding claim 18, Kenny, Jr. et al. discloses in e.g., Fig. 17A said package (2000) being a bumpless build-up layer package (see Fig. 12A and column 18, lines 56 – 59).

Regarding claim 19, Kenny, Jr. et al. discloses in e.g., Fig. 17A a packaged integrated circuit (2000) comprising:

- an integrated circuit (200; column 9, lines 64 and 65);
- an integrated electroosmotic pump (1230; column 24, lines 29 – 30);
- a combiner (the condensation area for fluid that is heated by the device 200 under the element 1410, i.e., in the element 1100; column 24, lines 48 – 58); and
- a bumpless build-up layer package (see Fig. 12A and column 18, lines 56 – 59) including said circuit (200), said pump (1230), and said combiner, said package (2000) including a build-up layer (400) that mechanically couples said circuit, said pump, and said combiner (see e.g., Fig. 17A).

Regarding claim 20, Kenny, Jr. et al. discloses in e.g., Fig. 17A said integrated electroosmotic pump (1230; column 24, lines 29 – 30) being formed on a first die (1100 and 1230, a part of element 1200 which is a die; see Fig. 8, Fig. 9 and column 11, lines 9 – 15), said integrated circuit (200) being formed on a second die (column 9, lines 64 and 65) and said condenser being formed on a third die (1100; see e.g., Fig. 17A).

Regarding claim 21, Kenny, Jr. et al. discloses said integrated circuit die being mounted on said integrated electroosmotic pump die (see Fig. 20).

Regarding claim 22, Kenny, Jr. et al. discloses in e.g., Fig. 17A said first and second dice being coupled. Furthermore, “copper-to-copper bonding” is product-by-process limitation, even though product-by-process claims are limited by and defined by the process, determination of

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patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). A “product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 116; In re Wertheim, 191 USPQ 90 (209 USPQ 254 does not deal with this issue); and In re Marosi et al., 218 USPQ 289 final product per se which must be determined in a “product by, all of” claim, and not the patentability of the process, and that an old or obvious product, whether claimed in “product by process” claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

Regarding claim 23, Kenny, Jr. et al. discloses in e.g., Fig. 17A including a heat spreader (1410; column 23, lines 34 – 36) coupled to said build-up layer (see Fig. 17A).

Regarding claim 24, Kenny, Jr. et al. discloses in e.g., Fig. 17A said first die including at least one electroosmotic pump on one side and a plurality of microchannels (1440) on the other side, said microchannels to circulate cooling fluid pumped by said electroosmotic pump (column 23, line 60 – column 24, line 1).

Regarding claim 25, Kenny, Jr. et al. discloses in e.g., Fig. 17A said first die being mounted on said second die with said microchannels facing said second die (see Fig. 17A).

Conclusion

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9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morris et al., List et al., Wolf et al., Cheon, Ohashi et al., Belady and Hamilton et al. disclose a semiconductor package having a semiconductor device with a pump.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Wednesday, March 16, 2005


GEORGE ECKERT
PRIMARY EXAMINER